IS EVOLUTION TRUE?

DEBATE BETWEEN

G. M. PRICE

AND

JOSEPH McCABE

VERBATIM REPORT OF DEBATE

ON

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BETWEEN

GEORGE McCREADY PRICE, M.A.

(late Professor of Geology, Union College, Nebraska, U.S.A.)

AND

JOSEPH McCABE

(Representing the Rationalist Press Association Limited.)

HELD AT THE QUEEN'S HALL, LANGHAM PLACE, LONDON, W., ON SEPTEMBER 6, 1925 (EARL RUSSELL IN THE CHAIR)

REVISED BY BOTH DISPUTANTS

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VERBATIM REPORT OF PUBLIC DEBATE

ON

IS EVOLUTION TRUE?

THE CHAIRMAN: Ladies and Gentlemen,—I have been dragged from my rustic seclusion in the month of September, and, worse than that, I have been compelled—and here I hope Mr. Price will sympathize with me—to break the Sabbath in order to preside at this meeting to-night. Why I have been asked to preside no one has informed me. What either of the speakers is going to say neither of them has told me, although I have been in their company for the last ten minutes. It was thought, no doubt, that I was open to conversion; and I will, at any rate, make this promise—that if I am converted to-night to the views which Mr. Price is going to expound I shall be willing to say so at the end of the discussion.

I am asked to inform you that this debate has been arranged by the Rationalist Press Association, and that Mr. Price is to-night the guest of the Association. Therefore, whether you agree with his views or not, you will, I am sure, do what we always try to do in this country to all disputants—namely, give him a fair, intelligent, and an appreciative hearing.

The order of the debate is this: Mr. McCabe will open on behalf of, or in favour of, Evolution, and will speak for forty-five minutes, and show you some lantern slides. He will be followed by Mr. Price, who will also speak for

forty-five minutes and show you some lantern slides. Mr. McCabe will then have fifteen minutes for reply, and Mr. Price fifteen minutes to wind up. All I have to do is to see that the speakers do not exceed their limit, and I have warned them both that I shall see to that.

I am, fortunately, not asked—nor, I think, are you going to be asked—to make any pronouncement as to the subject of the debate; but I would request this of the speakers—that they will come really to grips with the subject. The wording of the resolution to which they are to speak is this: "That the plants and animals of our world, including man, have developed from some form or forms of primitive life by natural processes." The affirmative will be taken by Mr. McCabe, and the negative by Mr. Price. Of course, the negative of the resolution is open to all sorts of interpretations. It might mean that the plants and animals had developed by unnatural processes; it might mean that they had developed apart from and without including man. The views of the two disputants we shall hear in due course; but I repeat that I do hope that both will come closely to grips with the subject. I can assure them that, in common with the rest of this audience, I am quite ready to be informed and to be instructed.

Now I will call upon Mr. McCabe.

MR. McCABE'S FIRST SPEECH

Mr. Joseph McCabe: Lord Russell, Ladies and Gentlemen,—

The subject which we are debating to-night may be put in a few words which are intelligible to everybody in the room: The truth or untruth of the doctrine of Evolution.

I am not clear myself on a point which Lord Russell has mentioned—namely, as to how far we shall debate whether this evolution was by natural or supernatural means. But understanding, as I do, that Professor Price denies the general doctrine of Evolution, while admitting Evolution within certain limits, I am going to apply myself to-night to the truth of the doctrine of Evolution. Many of you will say: "Surely that is like proving that the sun has been shining occasionally in the heavens." But you have been reminded repeatedly of late that there are millions of people who still deny, contemptuously deny, the truth of the scientific doctrine of Evolution. You know what has been happening in America. There are at least ten million people in this country who agree with Mr. Bryan, and the specific interest of the debate to-night is that Professor Price is, I believe—no doubt he will correct me if I am wrong—the only Professor of Geology in the world whom those people can quote for their attack upon Evolution. Surely it will be of some interest to us all to hear what he has to say against the concordant and unanimous testimony of all the university professors of geology and paleontology in the world.

It occurs to me—I suppose it does always to one partner in the debate—that I should have three-fourths of the time to summarize those millions of facts which tell in favour of Evolution. Possibly my opponent will find millions of facts against Evolution; but remember the issue behind this debate to-night—aye, remember the issue behind this world controversy. Something over fifty years ago a great man of science launched the doctrine of Evolution upon the world. Generation by generation, decade by decade, scientific men have fought out that issue. I say that there is not a university professor in the world to-day

who does not emphatically endorse the doctrine of Evolution; and if, after fifty years of research and discovery, fifty years of most critical discussion, the whole of the representatives of the six or seven relevant sciences are wrong, then you may cast aside all your respect for science. Science is discredited as no disillusion in the world could discredit any large body of intellectual men.

I am taking to-night three aspects of Nature. The first is, in a familiar phrase, the record of the rocks. Suppose we could pass down through this floor on which this hall is built; suppose we could sink about one thousand feet. What should we find? I am not using my imagination, as many of you will know. Several borings have been made within a few hundred yards of this spot. The deepest of those borings goes down about 1,100 feet, and I can tell you what you would find if you sank down under this floor for 1,100 feet. First, the superficial rubbish of the earth, the gravel, and so on. I take no notice of that. Then you would find, as every Londoner knows, a great bed of clay 120 feet thick. What does it mean? It means that during prolonged ages this part of the earth was under water. It means that the finer silt, the finer sediment of the rivers, pouring into the sea which covered the site of London, has, age after age, poured its sediment slowly, gradually, peacefully, on the floor of that sea until, with the pressure of millions of tons of overlying earth, it has been compressed into those 120 feet of clay under our feet. Go lower still, and you find you would pass through 650 feet of chalk. I think most of you know what chalk means. It is a compact mass mainly of the shells of microscopic organisms floating on the surface of a tranquil sea, a warm sea. How many ages do you suppose these tiny little microscopic things, all at least

as small as the smallest grains of salt you use at table, were accumulating at the bottom of the sea to give those 650 feet of compressed material which is underneath us to-night? We know to-day how long—something like 50 million years. Underneath again you have 50 or 60 feet of limestone. Once more, at a still earlier date, this part of the earth was deep under water. It lay at the bottom of a warm semi-tropical sea, a clear peaceful ocean in which the limestone was laid. Underneath that again you have those famous Old Red Sandstone rocks which you are familiar with in Devonshire. What do they mean? They are the sediment deposited in a lake. Three hundred or four hundred million years ago this part of the earth was covered with a deep lake, and once more the characteristic is that those grains of sand, coloured and cemented by the iron, must have been laid in a prolonged age of tranquil, slow, gradual deposition. There are no convulsions under your feet.

Now, the crust of the earth is not generally so peaceful. Here we are living on a great ball of iron, its surface corrupted, torn, and ground into soil which has been made into rocks; but it is shrinking. This globe of ours is growing smaller, and at times this crust that seems so solid to us, even masses of rock one thousand feet thick, are taken up by these gigantic forces, and crumpled as a child crumples a sheet of paper. You have seen yourselves sometimes on the face of a cliff or a mountain-side those solid seams of stone twisted and distorted, while at times in this splitting of the crust of the earth you may even have one of those older strata of rocks thrown over a younger stratum.

We are accustomed to all sorts of contortions in geology, but we can disentangle them; and as, over the great mass

of the earth, those stones are evenly laid, we can interpret them. For a long time it was difficult to say how long it had taken the agencies of the earth to make those rocks. Fortunately, as most of you know, a new science has come to the aid of the geologist. Some years ago we discovered a wonderful metal called radium, which led to the discovery of an even more wonderful metal called uranium. Uranium breaks up. Its tiny atom is so unstable that once in a thousand years it shoots off parts of its substance, and again in another thousand years, until at last the residual substance is a peculiar kind of lead which the chemist can identify. And round that lead sometimes you have the gases that have been shot off.

It occurred to men of science that if in the rocks under our feet there is a definite proportion of uranium and lead, they have the time when those rocks were deposited. Those volcanic rocks, the molten matter which rushes through the rocks and is deposited at all levels of the earth, contain uranium, and our men of science for the last fifteen years have been examining, with infinite patience, what is the proportion of uranium and lead in those rocks. I know no physicist in the world, and no professor of geology in the world, who doubts the result. As the Chairman of the British Association said only last week, "The argument is irrefutable." The rocks may be older than we say, but at least this chronometrical machine gives us the minimum age of the rocks under our feet, and it tells us that that London clay, representing a definite geological period, was laid down 50 to 60 million years ago. It tells you that the older limestone, of which I have been speaking, was laid down 250 million years ago. It tells you that those Old Red Sandstone rocks were laid down 350 to 400 million years ago; and the deeper series

of rocks cover a period of at least something more than 1,000 million years. Scientific men are agreed upon it, so now we have our older and our younger rocks. And what do they show? They are the catacombs, they are the tombs, of the myriads of living things that have gone before us.

During the first half of the story there are very few fossils. So we should expect, on the lines of Evolution, because up to that time living things had no hard shells, no bony skeletons, to be preserved. The absence of fossils confirms us. When fossils first began they were rudimentary shell-fish, rudimentary worms and snails, and coral. There were no fish, and there was no land life.

We pass to another period when fish began; at first uncouth things, utterly unknown anywhere in the world to-day. So we rise from level to level of the Old Red Sandstone, and we find the fish becoming more and more like the modern fish. We trace the moment when the fish leaves the water, and begins to breathe by lungs. We trace the beginning of amphibious animals and of reptiles. We find the reptiles being succeeded by rudimentary birds and rudimentary mammals. From the lowest level to the highest level it is one great orderly procession up to the forms of life we see on the earth to-day. That is one aspect of nature, but it means countless millions of facts. Every single fossil in the crust of the earth is an argument for Evolution, and not one single form has ever been found which is in the slightest degree inconsistent with the doctrine of Evolution. That is the massive testimony to which men of science pin their faith.

I take another aspect. Suppose we look over the earth as we find it to-day. Take the distribution of the animals. You remember, I presume, that when the Spaniards invaded

America a few centuries ago there was not a horse on the entire continent, but underneath the soil of America we have discovered the bones of the ancestors of the horse slowly developing through ten million years. The horse grew. The horse appeared and developed in America, and there was not a single horse in America when the Spaniards went there, and not a man who knew what a horse was. But here it is in Europe, in Asia, and in Africa. Why? Why, except that, as the Evolutionist says, the horse was evolved in America, but as the land was bridged from America to Europe the fully developed horse crossed the bridge. As Professor Sambon suggested to me, one of those deadly parasites of the horse arose in America, and destroyed the horse in America; but here it is in Europe and the rest of the world. How do you explain that except as part of the story of Evolution? Why is there no elephant in South America? Why is there no camel and no giraffe in that beautiful environment in South America? Why has each continent, except in so far as continents are linked together, in so far as animals travel, its own characteristic fauna? Why have islands only those which can float over or fly over? I will ask particularly this question: Why is it that when the first man went to Australia there was not one single animal in Australia of a higher type than the kangaroo: no cat, no dog, no lion, tiger, wolf, hyena; not a single one of our higher mammals? According to our story of Evolution, the kangaroo was the highest type of life on the earth two hundred million years ago. Why was the clock stopped in Australia? Again there is no explanation whatever except on the lines of the story of Evolution. Just at the time when the kangaroo was the highest type of animal on the earth Australia became an island; it was isolated by the ocean, and none of our higher

mammals were there until the boat-building man came along and could penetrate into it. Indeed, the whole population—except again in so far as birds can fly over and seeds can float over—the entire animal and plant population of Australia, stopped one hundred million years ago.

I will enforce it just a little further. New Zealand is fifty million years more primitive than Australia. In New Zealand, when man came, the highest animal in the whole Dominion was the Tuatara, an ancient lizard, a more primitive and ancient reptile than any in the whole world. I have seen it and examined it, and the answer from the side of Evolution is: We know that at one time a great continent connected the south of Asia, Australia, South Africa, and South America. From South America, where we find the bones of those things, ages ago they passed into Australia. Then the ocean raised its barrier, and no higher type of life ever entered Australia. But New Zealand is the furthest outpost of that extinct land, and naturally it was the first piece of land to be detached; and the clock stopped in New Zealand 250 or 200 million years ago.

Why have you fishes with lungs only in Australia, Africa, and South America? Because of the lost continent that united them at one time. There was an age when they were as numerous as the herrings in this part of the world. There are specimens of thousands and thousands of fishes with lungs in the rocks of England to-day, but they are to be found only in Australia, South America, and Africa. The geographical distribution of animals is just as convincing and just as unexplainable on any other principle as that record of the rocks, that written testimony to the story of life, of which I have spoken.

I take a third aspect. Suppose we go into the framework of the living thing. Take a bird. I fancy—I naturally look for correction if I am misinterpreting Professor Price's opinion—that he admits the evolution of one species from another species, admits it in general, but does not admit that the great types of animals, the reptiles, the birds, and the mammals, were evolved from any earlier ancestor. Why has your bird, why has the hen we see every day, legs and feet covered with the scales of a reptile? If you hide the upper part of your bird, how very like the lizard it is! Further, why has your bird so commonly the rudiments of toes on the corners of its wings? They are developed sometimes; and one bird, even in England, has those toes fully developed, with claws, on the ends of its wings. That runs through the whole of nature. Why do certain whales, which when they are adult never use teeth, have teeth when they are young, which they absorb once more and never use throughout life?

Let us come nearer. Let us come to man himself. Many of those people in America who are opposing Evolution think that, even if we admitted Evolution generally, man, the summit of creation, stands out separated by an unbridgeable gulf from the whole of the rest of the living world. Why, on the contrary, if we had no proof of Evolution in nature, man alone would compel us to believe in Evolution. Remember it does not depend upon certain stones and bones that we find in the rocks. An anatomist would take any single person in this room and prove to demonstration the evolution of man and the doctrine of Evolution from that single body. Have you ever read anywhere an intelligible explanation of why the male human being has breasts? Often he suckles the young; and in every one of these cases where I am speaking of what we call the

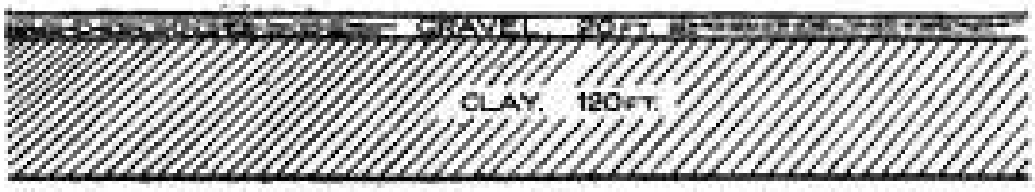
vestigial organs, organs which are traces of some earlier ancestor, remember always they link us intimately with the lower animals, as we call them. The male monkey also has those vestigial breasts, and occasionally the male gives milk to the young. Right through the whole mammal world they go. Every male mammal has those traces of the apparatus for suckling the young. I am waiting for an explanation in other terms than those of Evolution. I have seen the head of a crocodile with apparently a large bullet or billiard ball poking out in the centre of its skull; and all our reptile skulls and amphibian skulls have that hole in the roof under which was the third eye, but none ever used it as far as we can see. Ages upon ages ago some creature had a third eye, but we cannot identify it, although it runs all through the entire world.

Why have we these bits of gristle on the sides of our heads? I mean no disrespect to ladies, who sometimes manage to develop them in a handsome form, but physiologically they are quite useless; and once more those useless appendages link us intimately with the apes and monkeys. They have them also, and they have them in a perfectly useless condition. Far back you must go, millions of years you must go, to a time when those organs were organs of utility.

So I might run over fifty different parts of the human body, but in the short time at my disposal I am merely showing you the broad aspects of nature, each of which embraces millions of facts, telling consistently and cogently in favour of Evolution. I am waiting for my opponent to-night to tell me one single fact in nature which he puts in the scale against those myriads and myriads of facts which tell in favour of Evolution.

Professor Price proposed that he should use a few lantern

slides, and I am rather pleased. I can illustrate best those general principles which I have been giving you by a few



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pictures, following the line and introducing one or two new lines in addition to what I have said.

First I am going to take you down, as I said at the beginning of my remarks, 1,000 feet through the earth

where we are to-night. A boring was made not many hundred yards away from here, and here is the succession of layers of rock through which you would pass going down 1,000 feet (*pointing to lantern slide*). First the rubble of the earth, then that famous London clay with which you are all painfully familiar—and let me tell you in a moment what it means—and then the 650 feet of chalk, limestone, and sandstone. But let us take them in succession, and enable you to realize what they mean. The London clay is the finer deposit. You know that when a river rolls down to the sea it throws its rock, gravel, and sand nearer the shore; and far out in tranquil water it carries the finer mud. Here in London this shallow sea covered the site of London so long that 120 feet, sometimes more, of that fine silt have been deposited on it. Naturally the bones of animals and leaves of trees were washed down in the sediment. What I am showing you at the present moment is a picture built entirely out of fragments that have been taken from the London clay—every detail except the colour—but we know those animals and plants include the crocodile, as you see (*pointing to lantern slide*). We know they demanded a warm, colourful climate. That is London fifty million years ago.

You pass down from the clay, and you find yourself in that tremendous bed of chalk. Chalk is mainly composed of the shells of microscopic marine animals, chiefly the one you see in the centre of that picture (*pointing to lantern slide*); but all belong to the same family, and nearly every one on that slide is microscopic. How long do you suppose it was before 650 feet of compressed chalk containing these shells were slowly sinking down from the surface? I am sure you will not wonder when I say that the radium clock—not applied to those shells, but to volcanic rocks interwoven

with them—indicates it took fifty million years at least for that mass of chalk to be formed over Europe; a great ocean not only overlying England, as you know, but a great sea stretching from our part of the world as far as the south of Asia. I want your attention to two things. First it was a tranquil sea. Those shells were slowly laid down age after age, with no revolution of nature. Moreover, they provided a most excellent and ideal burying place for animals, and the consequence is that where we find easily preserved animals in the chalk, such as sea urchins and ammonites, we find them gradually passing from one species to another, even from one genus to another. We find the whole gradual story of Evolution illustrated in the chalk.

Below the chalk we have limestone underneath us to-night. That was the kind of sea that overlaid Europe and part of England when that limestone was formed (*pointing to lantern slide*); a clear, blue, warm, semi-tropical ocean. Why has my artist put that mass of corals there? They are round the summits of mountains of Europe to-day. There are, round those hills you pass going from France to Switzerland, the Jura Mountains, great masses of coral; and every detail of this picture, and of all my pictures, is an actual detailed expression of the rocks. There again you find the starting of life in our familiar forms.

I said that the rocks of the earth do not always lie so peacefully and tranquilly as they do under London. Here is a scene with which many of you are familiar: the Valley of Chamonix, at the foot of Mont Blanc (*pointing to lantern slide*). Towns have been built in this valley, and in digging the foundations we know the rocks under that valley as we know the rocks underneath London. In that valley, and at Ferret, hundreds of feet of solid rock have been bent as if they were india-rubber or cardboard; and I think you do not

need any geologist to tell you that there was a time when those rocks followed the dotted line and went 15,000 feet above the summit of Mont Blanc to-day. It is not surprising that occasionally an older stratum of rock is actually crushed over a younger stratum. Lower still we could go, but I will turn to a different matter.

To-day in nature the various kingdoms lie far apart—that is to say, the various reptiles, birds, and mammals; but even in nature to-day there are connecting links. Here are two of those fishes with lungs of which I spoke—the Australian barramunda with one lung, and below it a South American fish with two lungs. It can breathe and live on land as well as we can. It has no fins, practically; it cannot swim; it walks. I have seen a photograph of one walking on the tips of those fins to take bread from the hand of its keeper. It walks at the bottom of the waters in America to-day. It is a connecting link as fine as any man could wish between life in the primitive ocean and life on the land. Some of those fishes at one time left the ocean and began the story of life on land; and it was precisely to that age of the earth our Old Red Sandstone rocks belong.

Then we have the coal beds. The land rises higher and higher. The waters grow narrower and narrower, and that section of the fish world becomes amphibious. Take our coal forests—and here I am sure I can expect Professor Price to agree. I do not suppose any one in the world would doubt that the great seams of coal all over the world are the remains of forests of long ago. What kind of life do we find in them? Never a bird, flower, or mammal; life enormously remote from any form we know to-day. Just towards the close of that forest period the land rises higher and higher; bleak mountain sides instead of succulent forests. Animals

leave the water entirely, and the next form of life we find on the earth is the reptile. I am not going to linger over the reptile. There is no great leap between the reptile and the amphibian. Only two years ago I was in Australia, and about 100 miles from Melbourne I went to visit a little valley. There I saw those unmistakable remains which tell us of an ice age. In India, South Africa, Australia, and over all that lost continent of which I spoke, a great mass of ice and snow spread. We should expect to find animals living in a colder climate; and surely enough the next type of life we find in the rocks is the bird. But what kind of bird? There is the fossil—that is to say, the body of a bird completely turned into stone (*pointing to lantern slide*). Examine it carefully. It has teeth in its jaws. It has a long tail, such as no bird in the world has to-day. It has perfectly formed toes and claws on the corner of its wing. It is half reptile and half bird. Under the direction of a scientific man it was restored in this way. I am not asking you to pin your faith on reconstructions, remember; but it will help your imagination to visualize the specimen. You can see the fossil any day. There are two bodies found from a period that must have stretched over fifty million years, but they are birds of terrible significance from the evolutionary point of view. We could not have desired, from the evolutionary point of view, more perfect connecting links between bird and reptile than those two little bodies found in the rocks of Bavaria. Even in nature to-day, as I told you, your bird shows that it had a quadruped ancestor.

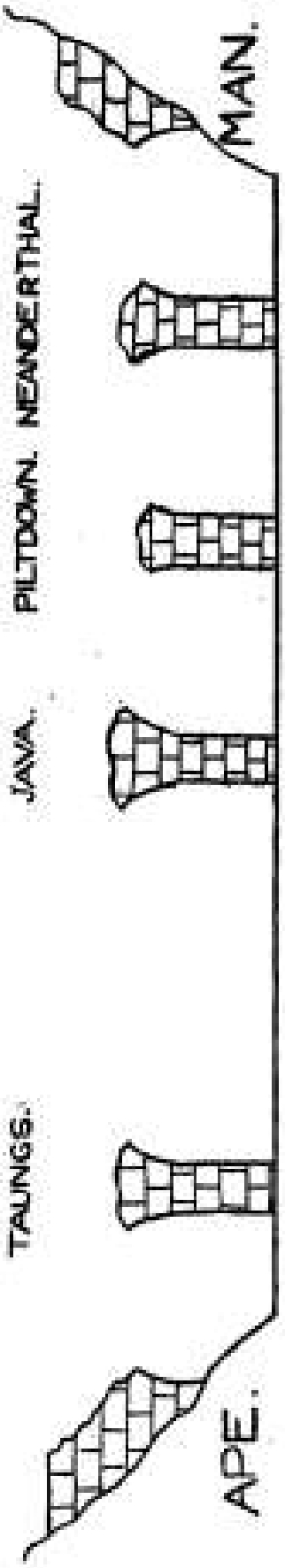
Here is a portrait of a living Asiatic pheasant; and, if you can see, it is actually climbing up the tree by means of toes and claws on its front limbs (*pointing to the lantern slide*). In most birds the toes have degenerated.

I said we found only two bodies of birds during a period

of 50 million years. What we find next of the bird type—I will not show you the fossils, but here is the restoration (*pointing to the lantern slide*)—are real birds, but they have formidable teeth in their jaws, as you can see; still one most important trace of the reptile even after 40 or 50 million years of development.

Again, the Evolutionist says that at the same time when the bird was developed the mammal was developed: a story starting some 150 million years ago. Actually in Australia to-day there is a wonderful little creature, half reptile and half mammal. Only three years ago I spent a day with the highest authority on the subject. I saw its eggs, its nest, and learnt everything about it. It is half reptile and half mammal. It lays eggs and it suckles its young—the only animal in the world that does so. We find its bones in the rocks; and again in this case every single point is full of significance. We find the bones of that furry, warm-blooded creature just after we find the traces of an ice age in the rocks. So my artist again restores it for you (*pointing to the lantern slide*). That was the first little mother that suckled her young; and one is tempted to think it was in those early days that the male shared the duty, and has shirked it ever since.

Now I come to man. There is a general opinion that a vast gulf separates man from the ape. It did one hundred years ago. It certainly does not to-day. I have ventured to design this bridge (*pointing to the lantern slide; see p. 24*) giving you the actual situation to-day. One hundred years ago, in the days of Lamarck and Darwin, men looked across that broad river and there was nothing between. Now we have men of the Stone Age carrying us nearer to the ape; the Piltdown man, and one or two others, going as far again in the direction of the ape. There is the



Java man half-way between man and the ape; and only lately, within the last few months, a new advance on the ape side, that Taungs skull representing an ape, and in the words of Sir Arthur Keith, the most critical and most conservative of our scholars, an ape far more human, more man-like, than any other ape in the world. Any day we may discover the fifth pier, and the gap will be bridged between the man and the ape. There is the Taungs skull (*pointing to lantern slide*). The position as to that is not finally decided, but there is no dissentient voice in the world that it is the skull of an ape with more human features than any one of the four man-like apes in the world. I acknowledge my indebtedness to the *Illustrated London News* in showing you this fine restoration of it. This restoration was effected under the supervision of Professor Elliot Smith, one of the highest and most cautious of our authorities. Compare it with the apes you see at the Zoo; and, believe me, we have only this year advanced from the ape side very considerably in the direction of man. There is the next step—the Java man (*pointing to lantern slide*). I will ask you to ignore the lady. The

artist was an exceedingly polite German artist, and was rather flattering to the lady of the Java group; but the Java man is very beautifully reproduced. Here is the actual fragment of skull, the upper part (*pointing to lantern slide*), which you can see for yourselves. We found also some teeth and a thigh bone, and there is to-day no doubt about the nature of those remains. In every museum in the world they are marked "The ape-man of Java." They fall half-way between man and the ape.

I took that photograph (*pointing to lantern slide*) only a few days ago at the Royal College of Surgeons: the skull of a chimpanzee and the skull of a typical man. In fact, it is the skull Sir Arthur Keith uses in his demonstrations, and between them there is an old brown, deeply dried piece of bone: the skull-cap of the ape-man of Java. Then comes the Piltdown man. Once more I will ask you to notice its position. It is more human. It is definitely human, and you can see the continual rise of the brow. Here is a jaw we found in Germany a few years ago. Notice the round contour, or the absence of chin, the ape-like character; and here is a most instructive photograph of the place where it was found (*indicating lantern slide*). You see the white cross, and no less than seventy feet of sand and gravel have been laid over that spot since that primitive human being laid his bones there.

Not long ago we found one in Rhodesia, not so old, but just at the same level of human development, four or five of these parts of skulls following between the Java man and the Neanderthal man. There you have the antithesis, the Rhodesian man, and what we have recently discovered, which is illustrated on the sheet. The Java man is far older and more prehistoric.

Then we come to the men of the Stone Age, of whom

that is a typical skull (*pointing to lantern slide*). Man was at least ten million years old when he had reached that stage of development. *There* is the reconstruction by an American professor in an American University (*pointing to lantern slide*); a specimen exhibited in the museum of a University in America.

I think I have demonstrated my position. I have shown that, whatever aspect of nature you study, every single detail testifies to Evolution. Let me remind you, in conclusion, that it is not a matter of life on the earth only. From one end of the universe to the other, in those thousands of millions of stars, there is the same great law of gradual progress; and, in fact, there is no human idea, there is no human institution, there is no single reality in this universe of ours, that does not fall harmoniously into line in this great doctrine of Evolution.

THE CHAIRMAN: Before calling upon Professor Price I ought to apologize to him, and to you, for not telling you when I introduced him that he was the Professor of Geology in the Union College of Nebraska, and therefore you are going to hear the other side also from a man of science.

PROFESSOR PRICE'S FIRST SPEECH

PROFESSOR PRICE: My Lord Chairman, My Honourable Opponent, Ladies and Gentlemen,—

My honourable opponent has relieved me of a good deal that I thought I would have to say. He has practically conceded that the whole of the Evolution theory rests on geology, and with that I most heartily agree. No sensible

person denies the *facts* of the rocks here and there, as he has presented them here to you to-night. The *interpretation of those facts*, however, may be a different thing, because I was not back there to see, and he was not back there with a camera to take pictures of that time. We can only read the history of the past from what we find recorded in the rocks; and from time to time, and from year to year, this interpretation has greatly changed. I have no quarrel with him as to the *facts* of comparative anatomy. We all know that there are creatures on the earth living to-day, and creatures found in the rocks of various grades; and you can arrange them in a series so as to look like an evolutionary series. There is no doubt about that. It is just a question of interpretation. But I believe that this whole matter can best be understood by getting at the history of this doctrine.

By referring to the history of this theory we should find that it was originally based on two chief points—first, the uniformitarian geology of Charles Lyell, which of course already included the serial arrangement of the fossils in a very definite order of sequence; and, secondly, the method of actually transforming species, as suggested by Darwin. As we shall see presently, this arrangement of the fossils into a long series supposed to be actually historical was itself really an artificial arrangement, and a clear begging of the whole question of Evolution; but the geological uniformitarianism of Lyell now took the place of the catastrophism of Cuvier; while the biological transformism of Darwin took the place of the successive creations of Cuvier. Unfortunately, within recent years both of these foundations on which it was built up have become discredited; yet, with its acquired momentum, the theory is still going strong, very much like the wonderful Ford

motor-car I once heard of that kept on travelling for twenty miles after its engine had dropped out—it kept travelling on its great reputation. Organic Evolution has been travelling on its reputation for nearly twenty years, or ever since Mendelism came in to discredit the *method* of variation which was taught by Darwin and Lamarck, and ever since the logical worthlessness of the evidence of the fossils was discovered about the same time. I may say right here that my honourable opponent's radium clock for telling the age of the rocks is still more uncertain and more worthless, if you can compare two worthless things, than arranging the fossils in chronological order.

If, now, we examine the proposition before us to-night, we see that it resolves itself into the same two parts—the geological and the biological. Our proposition is: "Resolved, that the plants and animals of our world, including man, have developed from some form or forms of primitive life by natural processes."

The first part of this proposition asserts a fact of world history, or an alleged world process, in which the *time element* is the main thing. This part is covered by the sciences of geology and palæontology, as has been presented. It asserts, not what *is*, but what *was*; hence it is all-important for us to have a trustworthy record of this alleged world history. Clearly enough, if an impartial geology—that is, one not vitiated with Evolutionary assumptions—can prove that the earth has been peopled with a long-drawn-out series of gradually advancing types of life, this fact alone would almost win the case. But if this geological witness turns out to be untrustworthy, and is proved to be deeply in collusion with the defendant, the inferences from comparative anatomy which have been presented to-night and from the curiosities of embryology

will not get us very far towards a scheme of Organic Evolution.

The second part of our proposition asserts a *method*—that is, it asserts a naturalistic explanation of this alleged fact of development, saying that this development (which must include the transformation of types) has proceeded according to "natural processes"—that is, according to processes now going on. This phase of the subject would have to depend upon the latest and best results of such sciences as botany and zoology, and in fact all the correlated biological sciences. Assuredly, a proposition or a theory which must depend upon so many of the natural sciences cannot be discussed at all adequately in the paltry forty-five minutes here assigned to me. However, after you have listened to what I have to say here, you may go home and read some of the recent books on this side of the case. It is often asserted that there is nothing of a scientific character on this side; but this is mere rhetorical camouflage. Similarly, the idea is often expressed that the general theory of Evolution is never questioned now except by the ignorant and the fanatical. Everybody in the world of any education, according to my honourable opponent, believes the Evolution theory. Let me show you some of these recent books which, according to this view, are shamelessly rushing in where angels would fear to tread.

First, here is *The Phantom of Organic Evolution*, issued last November. It would not be in good taste for me to praise it, or to recommend every one of you to read it, for I wrote it myself. Then here is *The Dogma of Evolution*, by Dr. Louis T. More, Dean of the Graduate College, the University of Cincinnati, Ohio, United States of America. It was delivered as a series of lectures at Princeton

University last January; the book is published by the Princeton University Press, and is handled in this country by the Oxford University Press. It is a high-class, scholarly work; although Dr. More had evidently not learned the whole sad truth about the geological evidence, for he will not acknowledge that there really is any other evidence worth considering—all the rest is mere dogma. The third book is *The Case Against Evolution*, by Dr. G. B. O'Toole, Professor of Animal Biology, Seton Hill College, Pennsylvania. This was published just a few months ago by the Macmillan Company of New York; and it is distributed in this country by Macmillan and Company, London. This latter is a very complete and carefully reasoned scientific argument; and in the geological part Dr. O'Toole makes full use of the destructive argument developed in my *The New Geology: A Text-book for Colleges*, which was issued in 1923. Even Dr. D. H. Scott's *Extinct Plants and Problems of Evolution*, issued last year, can only be regarded as on our side; for it certainly damns with very, very faint praise the theory it professes to defend. It was written last year.

The late Lord Morley once said: "An educated man is one who knows when a thing is proved and when it is not. An uneducated man does not know." I am perfectly confident that any competent person who will take the time to traverse the evidence now available on this side will reach the same conclusion that I have reached—namely, that the theory of Organic Evolution was a very plausible theory for the times of comparative ignorance of the real facts of heredity and variation and of the facts of geology which prevailed during the latter part of the nineteenth century; but that this theory is now entirely out of date, and hopelessly inadequate for us, in view of the facts of geology and

of experimental breeding as we now know them. We are making scientific history very fast these days; and the specialist in some corner of science who keeps on humming a little tune to himself, quietly ignoring all this modern evidence against Evolution, is simply living in a fool's paradise. He will soon be so far behind that he will wake up some fine morning and find that he needs an introduction to the modern scientific world.

Let us now consider for a moment just what kind of evidence would be sufficient to prove the proposition before us. And I will call your attention to the fact that my honourable opponent did not take the proposition, analyse it, and show exactly what was in it, but he took the general theme of Organic Evolution as if it meant the same thing. Perhaps it does, and perhaps it does not.

1. One of the first things that my honourable opponent ought to do is to show us the real *cause* or *method* of Evolution. He is absolutely bound to show us the present-day "natural processes," as mentioned in our proposition, which have brought about the transformation of species. Darwin has told us that he thought it "almost useless" to try to prove the truth of Evolution until the *cause of the change of type* was discovered (*Darwin and Modern Science*, p. 358). And when he thought he had found the real cause, or the method of organic change, he was able to convince the world of the theory. But we now know that Darwin was quite mistaken. To-day there is no agreement whatever among biologists as to any change or any method that could possibly bring about a change of specific type. It would be in point for my honourable opponent to bring forward some specific examples which would satisfy a group of such men as Dr. William Bateson, Thomas Hunt Morgan, J. P. Lotsy, D. H. Scott, J. T. Cunningham,

E. W. MacBride, J. C. Willis, David Starr Jordan, among others I might mention. A few examples only will satisfy us—say a half-dozen, or even three or four. He might get something to satisfy one; I defy him to get an example to satisfy two or three of them. They do not agree among themselves. A few examples only will suffice—let us say half-a-dozen, or even three or four. Such objective proof of specific change by "natural processes" might save either Lamarckism, or Darwinism, or De-Vriesianism from going bankrupt (whichever one his examples happened to favour), and might postpone indefinitely the appointment of that scientific receivership which has been loudly talked of for all these three concerns.

2. In the second place, I think it very essential for my honourable opponent to remove the dark cloud of suspicion that now hangs over the geological evidence, as ordinarily presented, and as he himself has presented it here this evening. I see that some of you understand what I am referring to, and I think you will all see the point before we get through to-night. However, I feel sure that my honourable opponent must know quite well to what I am here referring; for the ramshackle, preposterous logic underlying the entire geological evidence for Evolution has been presented at much length in this splendid volume by Dr. G. B. O'Toole, published just a few months ago; and I give my honourable opponent credit for being sufficiently up to date to have read this notable book in his preparation for this debate.

Here is the summary of the case against evolutionary geology, as given by Dr. O'Toole on page 126 of this book: "The geological argument is simply a theoretical construction, which presupposes Evolution, instead of proving it. Its classic pedigrees of the horse, the camel, and the

elephant are only credible when we have assumed the 'fact' of Evolution, and even then solely on the condition that they claim to approximate, rather than assign, the actual ancestry of the animals in question. In paleontology, as in the field of zoology, Evolution is not a conclusion, but an interpretation."

As I myself was the first to point out this vicious circle of reasoning nearly twenty years ago, it is gratifying that now others also are recognizing this logical worthlessness of the geological argument, which, as I have said, is the star witness in favour of Organic Evolution. Hence, I say again that my honourable opponent ought surely to do something to remove the cloud of logical suspicion now resting upon the geological evidence for his theory.

3. Thirdly, with reference to the familiar line of argument from comparative anatomy, it is not at all sufficient for him to stand the skeleton of a man up alongside that of an ape, or a bird alongside that of a reptile, and to point out in detail how all the bones of the one resemble those of the other. He should also prove that these resemblances cannot logically be accounted for in any other way than the one he adopts. In the case of man it might have been reversely: the ape might be a degenerate or hybridized man, if there really is any genetic relationship. Lotsy's theory about hybridization is worthy of consideration here.

But everybody knows that structural similarity does not always indicate blood relationship. What about the thousands of cases of "convergence" or "parallel development," which of late have become so notorious? Here is a well-known scientific work, *Convergence in Evolution*, by Dr. Arthur Willey, of McGill University, Montreal, in which hundreds of examples are given of similar or identical structures found in animals so widely separated in the

classification series that it would be absurd to say that one set of structures was derived from the other.

Moreover, how would my honourable opponent undertake to make some half million or so of distinct species of animals, covering the wide range of size and form which we actually see from the protozoa up to man, or to the elephant or the whale, without there being very many cases of almost duplication, thousands of cases of partial similarity in their structures, such as a study of comparative anatomy reveals? It simply could not be done. One could not make by any means whatever a half million distinct kinds of animals without having just about such examples of overlapping or duplication of structure as we see around us.

4. There are several other points that I think ought to be cleared up; but I have time for only one more. I suggest that my honourable opponent ought to show us a probable, or a possible, origin for at least some of the great divisions of the animal and vegetable kingdoms, usually called the *phyla*.

We have far too many of these great primal divisions, some eight or ten phyla of the animals, over half as many of the plants, and not one of them has ever been shown to be even remotely related to any of the others. These are quite too many for him to have to start with. If we must throw away all our modern biological experience since the notable days of Louis Pasteur, and must say that spontaneous generation has occurred in the past, it is demanding altogether too much credulity on our part for us to say that this miraculous event, this springing of the living from the not-living, has occurred over a dozen times, and that in each instance this miracle resulted in the starting of an entirely different line of life, having no resemblance what-

ever to any of the other lines that presumably had arisen previously in the very same way. Our proposition appeals wholly to "natural processes"; what modern natural processes can we see around us to encourage any such wild pipe-dream as this?

Now you all know that my worthy opponent has not cleared up a single one of these four difficulties just stated. But while he is thinking out a method by which he may give us some of these proofs in the fifteen minutes which he is soon to have, we may go on to consider some other features of the subject before us.

It does not take a Solomon to see that, in any broad or philosophical view of Organic Evolution as a whole, the first part of the proposition before us, or the geological part, must be vastly the more important. The geological record of what has taken place in the past is primary in point of logic, the other quite secondary; just as we know from the history of these sciences that the geological form of the theory came first, and was really the part on which Darwin built. With this general view of the matter all clear thinkers have always been in complete agreement. Thus, Thomas Hunt Morgan, of Columbia University, New York City, says: "The direct evidence furnished by fossil remains is by all odds the strongest evidence that we have in favour of Organic Evolution" (*A Critique of the Theory of Evolution*, p. 24). Huxley has told us that Lyell's system of uniformitarian geology "was the chief agent in smoothing the road for Darwin," so far as he himself was concerned. And everybody knows that Lyell's book, which Darwin took with him on his voyage on the *Beagle*, was the intellectual groundwork of all of Darwin's subsequent work. As Judd has expressed it: "If Lyell's *Principles of Geology* had not been written, we should never have had *The Origin*

of Species." And, I may add, we should not be here to-night discussing Organic Evolution.

I have dwelt upon this point at some length because it is of the utmost importance that we see these things in their true perspective. As I have said, our subject naturally falls into two great divisions—the geological and the biological, the latter itself capable of much subdivision. All of these biological arguments which have been presented from embryology, comparative anatomy, etc., might serve to encourage a mind already convinced of some sort of Evolution in some large general way; but the facts covered by each of these arguments *could* be interpreted *otherwise* very easily; and *all of these arguments combined could never create the primary notion of a real succession of different types of life covering a long period of time, and a gradual advance in the grade of life during this period.* This latter notion can be created in our minds by a trustworthy geology and paleontology, and can be created by them alone. A geology free from evolutionary assumptions that we can trust absolutely is a pre-requisite to any and every scheme of Organic Evolution.

From the history of the subject, which I have not the time to enter upon to-night, we know that in Darwin's time the geological argument was taken for granted, without ever having been proved; that it is still being assumed entirely without proof; and that it has not been seriously questioned until comparatively recent times. Since Darwin's day all the various sub-divisions of the biological argument have been examined with care; and it must be confessed that the results have proved very disappointing. Darwin and his immediate followers thought that they knew exactly *how* one type can be transformed into another type; but with our more accurate knowledge of variation and heredity,

known as Mendelism, modern biologists shake their heads with a smile at the crude notions of variation taught by Darwin, and confess that they *are still looking for what Darwin thought he had found*—namely, some clue to the transformation of species—but hitherto without success. I also know of many boy mechanics who are still trying to invent perpetual motion. And I know of some biochemists, as they call themselves, who are still trying to prove spontaneous generation. These are interesting psychological studies in the will-to-believe. Hope springs eternal in the human breast when the will-to-believe urges it on.

J. P. Lotsy, the Holland botanist, thinks that new species can originate by hybridization; but in the light of Mendelism he does not believe that new species can originate in any other way. As for the actual tracing out of evolutionary pedigrees by means of the fossils, he says that he has wasted the greater part of a lifetime in this way, which he now regards as pseudo-scientific nonsense. He says: "Phylogeny—i.e., reconstruction of what has happened in the past—is no science, but a product of phantastic speculations" (*Evolution by Means of Hybridization*, p. 140), and I agree with him.

Dr. D. H. Scott thinks that this may be going a little too far, but he confesses: "Like Dr. Lotsy, I have become sceptical of late as to most phylogenetic reconstructions" (*Extinct Plants and Problems of Evolution*, p. 18; 1924)—that is, with regard to efforts to trace out evolutionary pedigrees, such as the horse, elephant, and camel.

Two recent addresses by notable scientists speak of believing in Evolution only as an *act of faith*. I refer to the one by D. H. Scott at Edinburgh some four years ago, and the one by Bateson at Toronto a few months later. Both of these eminent men declare in so many

words that we do not know how species originate or become transformed—the very thing which Charles Darwin thought he had solved. I have these two addresses right here on the table if any one questions my summary of them.

Thus our biologists now speak of believing in Evolution "as an act of faith," because they have become disappointed in trying to find the origin of the breeding-units called "species," which origin still remains "utterly mysterious," as Dr. Scott puts it; just as is the case with the origin of life itself. Now, the proposition we are here discussing does not speak of "an act of faith"; it speaks of "natural processes," which can be established by well-authenticated scientific facts. Thomas Henry Huxley has told us that the man of science has learned to trust in "justification, not by faith, but by verification." But now, in this year 1925, we still have to take as a mere "act of faith" the very thing that Darwin thought he had proved. Is this progress or is it disillusionment?

We have no real scientific knowledge either of the first beginnings of life, or of the origin of those breeding-units which men of science term "species." And my whole contention is that we must now extend this agnosticism so as to include also the origin of all the great groups of living things, call them what we will—genera, families, orders, classes, and phyla. My position on this point is substantially that taken by Dr. J. C. Willis, of Cambridge University, in his recent remarkable book, *Age and Area*, where he says:—

"Evolution did not proceed from individual to variety, from variety to species, from species to genus, and from genus to family; but inversely, the great families and genera appearing at a very early period, and subsequently breaking up into other genera and species" (page 221).

In harmony with this view is the statement by Dr. H. B. Guppy, who has said: "The age that witnessed the rise of the great families and the age that witnessed their subsequent differentiation are things apart, and cannot be dealt with by the same method."

If we accept wholeheartedly the results of modern experimental biology, I do not see what other position we can take. This also seems to me to be in full accord with Dr. Bateson's theory of factorial analysis, or evolution by loss and not by gain, as enunciated in his Australian address in 1914. Of course, this theory would be quite limited in its scope, and is wholly antagonistic to the theory of Organic Evolution which we are discussing here to-night. This Guppy–Willis theory might suggest how the great diversity among plants and animals *could* have come about by some method of factorial mutation from certain primal types; but it is evident that we must have these primal ancestors, and a good many of them—that is, enough to start all the great orders, probably all the more important families. For the first point in the recipe for making rabbit-soup is that you must first get your rabbit.

If I had time, I should like to present the very damaging evidence against Evolution given the past year or two by the botanists—such as A. C. Seward, A. G. Tansley, F. O. Bower, and D. H. Scott, the last having already been mentioned briefly. But I must pass on to take up some of the lines of evidence against the relative ages of the various fossils. Some of these evidences are *minor* ones, because they merely create the suspicion that there must be something wrong with the accepted theories, though they do not show what the wrong must be. Other evidences, however, are *major* ones, and render these theories utterly impossible and unscientific.

I cannot take the time to say much about the minor points against the theory. Any one who has travelled about the world with his eyes wide open, or who has kept up his reading of the scientific literature of the past quarter of a century, has run across hundreds of things that seem to cast suspicion on the accuracy of the time-theories of geology.

For instance, here is a report written by the paleobotanist of the University of Chicago, describing a Paleozoic Angiosperm that he found in a Carboniferous coalball. This discovery has been questioned, but the point is not yet disproved. Such a discovery would be about as unsettling as would be the finding of a human skeleton among the bones of a dinosaur. The latter has not yet occurred; but here is something much like it, the drawing of a dinosaur made by prehistoric man, this drawing having been found on the wall of a canyon in Arizona, one of the branches of the Grand Canyon of the Colorado. The *Illustrated London News* of May 9, 1925, gave a reproduction of this ancient drawing; but here is the original report of the Doheny Scientific Expedition, describing this discovery. And you cannot sneer at this discovery either, for the official scientist of this expedition was Charles W. Gilmore, Curator of Vertebrate Paleontology, United States National Museum, Washington, D.C. This drawing of the dinosaur was close to another drawing of a mastodon or some other kind of elephant, depicted in the attitude of striking a man over the head with its trunk. All of these drawings are very, very old; and, obviously, the prehistoric man who made this drawing must either have seen a dinosaur alive, or he must have received a good description of the animal from some human being who had seen such an animal alive. The picture is almost the exact duplicate of that on the

outside cover of my honourable opponent's *The A B C of Evolution*.

Yet one scientist, when shown this drawing, said: "It cannot be a dinosaur; that is impossible. For we *know* that the dinosaurs were extinct twelve million years before man appeared on earth." Now, how can one argue with a man who knows as much as that?

As Kipling says in his poem, *The Benefactors*:—

> Ah, what avails the classic bent,
> And what the cultured word,
> Against the undoctored incident
> That actually occurred?

I could stand here by the hour and tell of discoveries like these, which, although they are quite inconsistent with the current geological theories, are nevertheless considered of only minor significance as evidence against these theories; because they have seemed to be merely isolated facts, mere puzzles, which the Evolutionist could refuse to accept as conclusive evidence, even though he could not explain them.

Before I take up the *major* arguments against the evolutionary theories of the fossils, I must pause to consider, though in the briefest way, the grounds on which the geological classifications are made. (*Mr. Price indicated chart; see p. 42.*) This list of the geological groups and systems is a very misleading affair to begin with, since most people seem to think that geologists have actually found all these rocks together in this serial order in some locality. Nothing is further from the truth. Nothing resembling such a series is ever found together, the most that are ever found in one locality being parts of perhaps two or three. These geological groups or systems are in reality put together in a purely artificial way by shuffling together all the representative names of the rocks from scattered places all over

the globe. This table, instead of being a world-timetable, *is merely a card-catalogue of the buried floras and faunas*

GEOLOGICAL CLASSIFICATIONS

GROUP	SYSTEM	SERIES	Dominant Type of Life
CENOZOIC	Quaternary or Post-Tertiary or Pleistocene	Recent Terrace Drift (Glacial)	Man
	Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Mammals
MESOZOIC	Cretaceous	Upper or Cretaceous Proper Lower or Comanchean	Reptiles, Conifers, and Palms
	Jurassic	Upper (Malm) Middle (Dogger) Lower (Lias)	
	Triassic	Upper (Keuper) Middle (Muschelkalk) Lower (Bunter Sandstein)	
PALEOZOIC	Permian	Upper Lower	Amphibians and Coal Plants
	Carboniferous	Pennsylvanian Mississippian	
	Devonian	Upper Middle Lower	Fishes and Insects
	Silurian	Upper or Monroan Middle or Salina Lower or Niagara	Invertebrates
	Ordovician	Upper or Cincinnatian Middle or Champlainian Lower or Canadian	
	Cambrian	Saratogan Acadian Waucobian	
Primary or Primitive	Algonkian Archæan		Few Fossils or None

CHART SHOWN BY PROFESSOR PRICE
(see p. 41)

of an older state of our world. The time-value of its various parts is purely imaginary.

The text-books often tell us that the fossiliferous rocks make a total of some thirty or forty miles in thickness. This, too, is very misleading. For in order to make this amazing thickness we have to imagine the various formations from widely scattered localities over the globe all brought together and piled up on top of one another. In reality, we never have to go down more than a few thousand feet in any particular locality, usually not more than a few hundred feet, before we strike the granite or the old primitive rocks, below which we never find any fossils. Hence, like the report which Mark Twain tells us he heard of his own death, this total thickness of the fossil-bearing rocks has been "greatly exaggerated."

By Cambrian, or Devonian, or Cretaceous we merely mean the rocks assembled from here and there over the earth which happen to contain certain kinds of fossils; for the stratified rocks are named and classified entirely from the kinds of fossils they happen to contain. The so-called "oldest" rocks are not always at the bottom, as shown in this diagram. *Any* of these formations may be at the bottom. *And they do not always look old.* I know of many instances where the Cambrian or Ordovician rocks look wonderfully young; they are soft and unconsolidated, and can be picked to pieces with the fingers, just like modern clay, or sand, or gravel. Such is the case with the Cambrian and Ordovician strata around the Baltic and over the greater part of Russia, also in some parts of the upper Mississippi Valley. Again, the so-called "young" rocks, such as the Tertiary and the Pleistocene, are often found next to the granite or the primitive, and are often extremely consolidated and even crystalline. This is the case with the Eocene and Miocene in many parts of California; also in the Alps and the Himalayas, and

with the Pleistocene of the Niagara Gorge, and in other places.

But why are these young-looking rocks said to be so very, very old? And why are these extremely old-looking rocks called very young? Just because of the kinds of fossils found in them. An old rock is one that contains "old" fossils—fossils that lived millions and millions of years ago, we are told. But which are the "old" fossils? And how do we really know that these particular kinds are so much older than the others?

I have here a large work, in these two immense volumes, entitled *North American Index Fossils*. It is by two of the leading specialists in America. But what is an "index fossil"? Why, it is a fossil which serves as a sure and infallible index of the age of the rock in which it is found. *Geologists do not prove the age of the fossils by the rocks*, as they are popularly supposed to do; *they prove the age of the rocks by their contained fossils*. An old rock is one that contains "old" fossils; it makes no difference what the rock looks like, nor what it is made of—sandstone, shale, or limestone. But how do geologists actually know which are the "old" fossils and which are the "young" ones?

Well, there is just the point. We are right back where we were at the start. In reality, the whole thing is a gigantic begging of this very question of Organic Evolution, a sort of logical (or illogical) "passing the buck," as the Americans would say. The geologist says that certain strata are the "oldest," because they contain the simplest or lowest forms of life; for he assumes that these kinds of life *occupied the world all alone at first*. Then the Evolutionist comes along and proves that his theory is true, because the simplest or lowest forms of life are found in the "oldest" rocks. How charmingly simple and con-

elusive! What a beautiful example of a dog chasing his tail!

Mark what I am going to say now: *Geologists do not actually know anything at all about the alleged relative ages of the various fossils.* Of course, in any particular locality we can prove that the fossils in the bottom layers must have been buried before the upper ones IN THIS PARTICULAR LOCALITY. This is only a matter of common sense. But how does the relative order of the fossils here in England give us any guarantee of the order in which we *will* find these very same fossils in Australia, in India, or in the United States? As Huxley pointed out years ago, "*All that geology can prove is local order of succession.*" When we come to the world as a whole, geologists have felt that they had to assume that certain fossils are always and intrinsically older than certain others; and for over a hundred years they have been working all over the globe, very industriously classifying all the stratified rocks on this assumption, which, as any child can see, is an evolutionary assumption. The earlier geologists started on this method over a hundred years ago under the guidance of "Strata" Smith and Baron Cuvier; and the tradition has been passed along from one generation of students to another, so that the modern scientific world has now accepted this idea blindly, on the mere authority of supposed experts. We can now see their childish logic; but in addition to this faulty logic many objective facts have lately been discovered which make these relative time-values wholly incredible and absurd. *There is no man on earth who knows enough about the rocks or the fossils to be able to prove, in any fashion fit to be called scientific, that any particular kind of fossil is actually and intrinsically older or younger than any other kind.* Geologists have felt themselves safe in making these

assumptions, because they did not suppose that any one would ever find any objective evidence to the contrary. But now we have these facts, and plenty of them, if I had time to show them.

If my honourable opponent thinks it so very easy to prove that the Cambrian trilobites and graptolites are actually older than the Cretaceous dinosaurs or the Tertiary mammals, I will give him an opportunity to try his hand at it pretty soon. If he is able to do the trick, the whole evolutionary world will make him their hero; for it will be the first time that any constructive line of evidence has ever been put together for such an idea. If he can prove this one point in a clear, logical, straightforward, scientific manner, I promise to become an Evolutionist myself here and now—as an "act of faith." But, mark what I say, since the entire theory of Organic Evolution in strict logic turns upon this one suspicious and unsettled point—the reliability of the fossils as sure guides and trustworthy tickets of the varying ages of the rocks, I claim that my honourable opponent ought to make a heroic attempt right here to prove this point with the utmost scientific precision. Let this one uncertainty be cleared up here and now. Now is his golden opportunity; for the entire world has been waiting, waiting, waiting, for this scientific proof for nearly a hundred years.

There are two great lines of argument I will mention here to-night against the reality of these theories. The first is what the geologists call "*deceptive conformities.*" In thousands of instances all over the globe very "young" rocks are found lying *conformably*, or in perfect *conformity*, on others classed as immensely "older," with nothing in the way of erosion or disturbance of any kind to mark the hiatus, or the "lost interval," or to indicate that many

millions of years had elapsed between the laying down of these two sets of strata. They look for all the world as if they had followed one another in natural and uninterrupted succession, even in quick succession. Often the two sets of beds look exactly alike—the same kind of shale, the same kind of limestone; they look like *one* formation, and we could not make *two* formations out of them except by their fossils. Yet, according to evolutionary geology, many millions of years must have passed after the lower beds were laid down, but before the next ones were deposited upon them. As I have said, there are thousands of such examples scattered all over the globe; and many of these examples cover comparatively large areas—scores or even hundreds of square miles.

Next, we have these conditions exactly reversed—not that the rocks are really upside down, but the order of the index fossils is exactly the reverse of the evolutionary order. That is, rocks that are called very "young" because of the fossils they contain are below, while others called very "old" because of their fossils are found lying upon them in what looks like a perfectly normal way; and these amazing relationships may extend for hundreds of miles. Such phenomena are called "thrust faults," or simply "thrusts," by evolutionary geologists—names which embalm the theory that the strata now on top were lifted up and pushed bodily over to where they are, though the line of contact between them looks exactly like any ordinary stratification plane. Indeed, the invariable characteristic of such phenomena is that the beds have every physical appearance of having been actually deposited in the anti-Evolution order in which we now find them. I believe they were, but I have not the time to describe these specific instances here and there.

MR. McCABE'S SECOND SPEECH

MR. McCABE: Lord Russell, Ladies and Gentlemen,—

I should like, in the short time now at my disposal, to know precisely what questions are in your mind, after Professor Price's speech, which you would like me to answer. I am not very clear on the subject. I am a painfully and perversely logical person, and in opening the debate I gave you three perfectly clear and definite points. I said that the case of Evolution rests first upon the geological record; secondly, upon the geographical distribution of animals; thirdly, upon the vestigial structures, which are the same in man as in animals, to which we claim he is related.

Professor Price had this disadvantage, that he had prepared a speech before he came here. I am a rather malicious person, and I took the trouble to find out what he was going to say. I therefore avoided the several arguments on which he has expended much ardour and much time. I did not say one word about them. I said not a single word about the evidence of comparative anatomy. That is one of the classic arguments so familiar that I was not going to give it to you to-night. The only point I took from comparative anatomy was vestigial organs; and on those vestigial organs which I put before you, or put before my opponent, I hope he is not going to make statements in the final speech which cannot be considered by me. I put before you a list of vestigial structures, and he has not said one single word about them. That was my third main argument. My second main argument was from the geographical distribution of animals, which cannot be understood except on the lines of the theory of Evolution. He has not said one single word in his forty-five minutes on

my second main argument. Two of my three arguments have been entirely ignored. The fourth was the connecting links between the great phyla of the animal world, and finally between the ape and man. I think I shall not be far from the truth when I say he has not said one single word about those. Therefore three-fourths of my speech has been ignored, and it is now too late to take it up. I could not give my reply to any criticism that was passed upon it now.

On the other hand, I have been challenged to put before you some theory of the method of Evolution. You did not come to hear any quarrel about the method of Evolution. You came to hear perhaps one quarrel—namely, whether the method was natural or supernatural. Why did I not enlarge upon that? For a simple reason that will occur to everybody. I assumed, as every philosopher—I was a Professor of Philosophy at one time—and everybody with common sense does, that when you are dealing with processes in nature you assume them to be natural until somebody proves them to be non-natural. As to which particular process or method it was, here is the handbill inviting you to the debate, and you will see from it that I have not undertaken to indicate any particular natural process, but to show that the animals and plants of the world were evolved from one or more primitive forms by natural processes. I understood it was for my opponent to bring in the theological question if he wished to prove that the natural processes were inadequate and you must bring in a supernatural agency. I am not supposed to mention it until he shows the inadequacy of the natural processes. If now he introduces the subject, I cannot reply or give you my opinion upon what he says.

As to the method, there is a very serious quarrel among

Evolutionists; and I have a very serious quarrel with the anti-Evolutionists on that point. They are throwing dust in the eyes of the people all over America and England by mixing up two totally different things in the scientific world—quarrels about the method of evolution and quarrels about the fact of evolution.

You have had many learned names read out to you to-night—not Dr. O'Toole. The only statement I made that justified the introduction of names was this: I said, I believe—I am open to correction—that there is no university professor of science in the world who disputes Evolution. Remember, I did not say who disputes Darwinism. I did not say who disputes Mendelism, or Lamarckism, or anything else. Let the people of the world understand this: it is not understood in America; it is not understood in this country. There is an absolutely unanimous opinion among all the university professors. To be precise, let me say free universities, not sectarian universities. I am not slighting them and their teaching, but they set up for their professors a standard of doctrine, and they must say nothing inconsistent with that doctrine. Therefore, I say there is absolute unanimity among all the professors of the seven different sciences concerned with Evolution all over the civilised world. There is only one teacher of science I know of who disagrees—the Jesuit Father Wasmann. But what Professor Price's opinion precisely is about Evolution I do not know. He read many names—take Professor Bower, for instance—every one of them a most emphatic Evolutionist; but they quarrel about two things. Most of those names some of you will know. They were botanists. What was the meaning of that? I never said one word about botanical evolution the whole evening. I never attempted to draw a tree for the botanical

world; I know the difficulty perfectly well, so I omitted entirely the plants of the world, and there is no meaning in bringing against me now the words of botanists as to the difficulty in their particular field. Every one of those men believes absolutely that all the plants of the world came here by evolution; but by what particular line and what particular means they are not agreed. We have nothing to do with that. I do not think you are here to listen to a discussion of the method, which is so uncertain in science. There was only one name to which I listened very attentively—namely, that of Dr. More—and I invite Professor Price to quote from Dr. More one single sentence in which he denies the *fact* of Evolution. That is the only name about which I care. O'Toole is a teacher in a sectarian college.

There were two difficulties, two main difficulties, that Professor Price had to meet. The first was the dark cloud that lies over geological methods. Well, what is the dark cloud? Towards the end of his remarks he told you how the older rocks sometimes actually overlie the younger rocks. Precisely what I told you in my own remarks. Some of you wondered why I talked so much about the contortions of the strata. That was the reason. I know perfectly well that older rocks occasionally overlie the younger rocks, and any of you who have seen strata contorted and twisted as if they were indiarubber will easily understand it. But why did Professor Price ignore the fact that here under our feet—do not go to the Rocky Mountains—are 1,100 or 1,200 feet of sedimentary rocks, perfectly evenly laid without any disturbance whatever? There is no sign of a catastrophe. And they go down the geological scale through eight different geological periods, and they contain fossils from the lowest, advancing

stage by stage up the biological tree to the present world. That is something to be interpreted. Why did Professor Price ignore this wonderful coincidence? He told you that the uranium clock is more worthless than the old geological clock. Well, you have Professor Price's opinion, and it may be that you will think it more valuable than the unanimous opinion of all the distinguished physicists in the civilized world. I happen not to think so; but merely to say it is worthless surely gives you no instruction whatever. And, above all, I want to know how he would explain the coincidence, that what the old geologists had called the oldest rocks have proved, on the new and entirely different test, to *be* the oldest rocks. The Old Red Sandstone is 500 million years old on the new test, and it is the lowest rock under your feet to-night.

Here are two lines of evidence in the hands of two different kinds of experts pointing in the same direction. Geology has not broken down. Professor Price has certain views on the geological series. They are not shared by one single university professor in the world, and Professor Price must pardon me when I decline to regard him personally as a dark cloud upon the whole geological world. So in regard to the biological side. Darwinism is disputed, Mendelism is disputed; but all of those men struggling with each other are unanimous on one point: every living thing in the world to-day, fossilized or living, has been evolved, and is part of one great tree of natural evolution. It goes beyond, and this is why I feel not only that science is not discredited by the result of this debate to-night; I feel something more. I feel that it is well that everybody should know both sides of this great question, because we want science not only in the laboratories, studies, and universities, but we want it in the minds of every man, woman, and child in the modern world,

I have just concluded some research, and written a book measuring, stage by stage, in every respect, the progress made in this country in the last one hundred years—the period of science. We have during that period made four times as much progress in every respect as the world ever made before in four hundred years. We owe that to science. We want more science; more trust in science; more trust particularly in Evolution, because Evolution is proceeding to-day infinitely faster than it ever proceeded before. We want our children trained in the schools to look back on that geological era. We want all our people—men, women, and children—manfully and candidly to face those oddly, uncouth forms of men of half-a-million years ago. Such our race once was. Slowly under the lash of Nature it has been driven onward to the level of to-day. But we are conscious human beings to-day. We know our laws and processes. We are forming our own power in this world; and what men did in those ten million years of Evolution we will, if Evolution is true, surpass in one hundred years of conscious, deliberate, and enlightened Evolution.

PROFESSOR PRICE'S SECOND SPEECH

Professor Price: My Lord, Ladies and Gentlemen,—

One point I have tried to set before you to-night is this: that there are intelligent men in the world who doubt this whole theory of Evolution. Now, I know that my honourable opponent can quote a good many people all over the world who believe in Evolution; but when it comes to a question of asking them *why* they believe it we do not find the same unanimity among them, and in a case of this kind we do not

want to be given a who's who, but we want a why's why. I must say that my honourable opponent did bring forward several points of comparative anatomy. I think it is a point of comparative anatomy when the birds are compared with the reptiles. I am sure it is a point of comparative anatomy when man is compared with the apes, and so all the way up the line.

I decline also to agree with my honourable opponent in saying that the process, or the method, of Evolution is an unimportant thing. I pointed out to you in my first speech that Darwin said he had considered it utterly useless to try to prove a general theory of Evolution until the *cause* or the *method of organic change* had been established, and when he thought this cause was sufficiently established he gave his theory to the world.

But we all know that Darwin was wholly mistaken, because the men of science have been following out the clues he set them, and we are now in the quandary and in the perplexity we see overspreading the scientific world to-day. I agree with my opponent that practically the whole of the scientific world has been until lately quite agreed with reference to the general fact of Evolution. But that, as I pointed out to you before, was wholly because of a wrong view regarding the evidence of the fossils. They thought, honestly too, that the fossils were independently testifying to the truth of Evolution, whereas we now see it was a pure case of manipulation; that the evidence had been manipulated to testify to this fact; and I claim that evidence which has been artificially arranged in this fashion is not competent to prove the general theory of Evolution at all. This is a point that the scientific world are only waking up to; and, as I pointed out before, this whole thing is clearly set forth in this book, *The Case against Evolution*,

by O'Toole. Some day, and not long in the future, this book is going to be known all over the world.

Now, my honourable opponent asked me expressly to give what Louis T. More thought about Evolution. He concedes there may be something in it, but this is what he says about paleontology:—

"The more one studies paleontology the more one becomes convinced that Evolution is based on faith alone, exactly the same sort of faith which is necessary to have when one encounters the great mysteries of religion."

If my honourable opponent is willing to put the case of Evolution on that basis of pure faith, I am ready to concede it to him. A man can have a faith in a thing like that if he wants to; but I do not. We have been told by a very high scientific authority that we should *never stifle a doubt*. I simply cannot stifle my doubts and face this evidence. I cannot face these things without saying that the whole Evolution scheme must be a blunder of some kind, and if I had the time I believe I could show you just where the blunder is, and what is the matter with it. We have been told by William Kingdon Clifford, another name well known in this assembly, that it is *wrong always, everywhere, and for any one to believe anything on insufficient evidence*. I cannot face such facts as I have been presenting before you to-night, and they are scattered all over the globe—I refer to deceptive conformities and thrust faults—and believe the theory of Organic Evolution is anything more than a blunder; and it is because these things are coming out that you find such a revolt against this theory on the other side of the Atlantic. There are intelligent people over there questioning this thing; and just as soon as these facts come over here you will find a lot of English people questioning them too. Talk about logic and the

need of adhering to the true scientific method! Why, the man who can cruise up and down some of these mountains, the Rockies, who can see the rocks standing a mile above his head, perhaps two miles, and then have the nerve to give the lie to these mountains towering a mile above his head and two miles above the sea level, in order to save his pet theory, has not learned the first principles of the true scientific method. As F. W. Westaway says in his book, *The Scientific Method*, "Any attempt to make facts square with a pet hypothesis is a sure and certain mark of the unscientific mind." And I claim that with a full and complete understanding of all the case as we now have it the theory of Organic Evolution is not in the same condition it was twenty or twenty-five years ago. If I had been living back there and had believed that geology could really testify to these fossil forms in a gradually ascending series, and believed that that was actually world-history, I would have had to be an Evolutionist, but I do not believe it, and we have evidence to the contrary.

A Voice: Tell us something new.

Professor Price: If I were to give you something new, and there is plenty of it, the Chairman would object. I only ask you, Ladies and Gentlemen, to read both sides of the case. Do not confine your reading wholly to one side. How can you know anything about a certain subject if you read only one side of the case? There is plenty of evidence on the other side, and this evidence is gradually coming out. My honourable opponent said he did not know precisely what Mr. Price believes.

A Voice: I do not believe I came from a monkey, any way.

Professor Price: I assure you these interruptions are from no friends of mine. I do not think that I have the time, or you have the patience, to listen to what I might believe about this. I am trying to tell you what I do not believe.

My honourable opponent has been telling you what he believes about it, and I do not believe it. I think that is sufficient. I would like to say this, however: that the reason why the botanists are so unanimously opposed to a straight view on Evolution is because the evidence from botany is so tremendously against the theories now current in the world to-day. I am not a botanist, but I do claim that the evidence from Dr. D. H. Scott is the most damning that there is in the whole scientific world to-day against this scheme of exact development from the lower forms up. But it would be the same in the case of the animals if the evidence in the case of the animals had not been manipulated to prove the theory.

This evidence really has been manipulated, and it is just because the theory has been built up upon that evidence that we are in the position that we are to-night. The whole thing is not yet settled; but I venture to say that within two years at the most you will see a very great change in public opinion here in England, as there is in America at the present time.

My honourable opponent is going to America in a few days, and I assure you that when he gets over there he will find a great many more educated people denying Evolution than he thinks he will find. Perhaps he will convert them all, as one person suggests. I doubt it. I know his ability as an orator, but I question whether he is able to convert so many. Do you know why the people in America are really more advanced along this line of

thought? It is because the evidence has been brought out there first. I am sure, my friends, that the thing that is needed in the world to-day is a full and complete knowledge of these sciences. I am not an enemy of science. I do not know of anything much more important for the world to-day than to have a knowledge of these subjects. I have been a teacher of science nearly all my lifetime, but I am sure that modern discoveries are fast leading us to the theories I have propounded.

MR. MCCABE: Before the proceedings close I am sure you will all be perfectly willing, and more than willing, to express your thanks to Earl Russell for presiding to-night. I ought, in accordance with the usual custom, to say how very strong and firm and impartial he has been. I have known Earl Russell many years, and I have my doubts about his neutrality on the subject. I will not give him away, and tell you which side he favours; but he does favour one particular side. To put it briefly, I am sure we are all obliged to Earl Russell for presiding to-night. We are very pleased to have seen him here, and I trust Professor Price will be good enough to second the vote of thanks.

PROFESSOR PRICE: I second the vote of thanks.

THE CHAIRMAN: Ladies and Gentlemen,—I am very much obliged to you for being so kind as to pass this vote of thanks, and I only regret that towards the end of the debate our visitor was a little interrupted when he was trying to pursue his argument. Do let us remember that when we are having a debate the person who is taking the other side is entitled to come here and say he believes in the first

chapter of Genesis if he wishes to. I admit I have been disappointed because Professor Price did not say that; but I did not expect him to, and I saw he was a scientific man.

I am asked to tell you that a verbatim report of these proceedings will be published by Messrs. Watts, and everybody who wishes to follow up the subject and to read the literature on the other side will be able to obtain it and get a list of those books which were mentioned by Professor Price in his argument.

I think I ought to say that personally I do not feel that my Sabbath breaking has been other than justified in the pleasure I have had in listening to this debate—a pleasure which I hope you have shared. I promised you at the beginning that if Professor Price converted me by his arguments I would say so at the close of the debate. I do not know that I am going to make that admission, but I would like to recall one statement he made—that what I and some of the rest of you believe about this matter is an act of faith entirely without reason. Well, Ladies and Gentlemen, that was a very serious charge to make against a Rationalist, and I am going home to think about it.

Price, George McCready, 1870–

Is evolution true? Verbatim report of debate between George McCready Price... and Joseph McCabe... held at the Queen's hall, Langham place, London, W., on September 6, 1925...revised by both disputants. London: Watts & Co., 1925.

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